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A NEW SPECIES OF *SPHAERODACTYLUS* (SAURIA, GEKKONIDAE) FROM ISLA MONITO, WEST INDIES

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Abstract.—Schwartz, A., Miami-Dade Community College North, Miami, Florida 33167.—A new species of *Sphaerodactylus* is described from Isla Monito, a tiny satellite of Isla Mona in the Mona Passage between Puerto Rico and Hispaniola. The species is quite distinct from *S. monensis* on Isla Mona and, despite its relationships with the Puerto Rican *macrolepis* complex, it superficially resembles Hispaniolan *S. savagei* and Bahamian *S. mariguanae*. A schema of the history of these geckos on the islands to the west of Puerto Rico is presented; the Isla Monito species is considered to be a relict of a formerly widespread western Greater Puerto Rican taxon.

Isla Mona is located in the Mona Passage, about midway between the Antillean islands of Hispaniola in the west and Puerto Rico on the east. The island's herpetofauna was reviewed by Schmidt (1926) and includes 1 frog, 6 lizards, and 3 snakes. This herpetofauna had a dual geographic origin, presumably by flotsam transport from the large islands on each side. Considering the small size (67 km^2) of Isla Mona, the fauna is relatively rich. Of the 10 amphibians and reptiles reported from the island, 4 (*Eleutherodactylus monensis* Meerwarth, *Sphaerodactylus monensis* Meerwarth, *Anolis monensis* Stejneger, *Typhlops monensis* Schmidt) are endemic. The remaining reptiles are either endemic subspecies (*Cyclura cornuta stejnegeri* Barbour and Noble, *Ameiva exsul alboguttata* Boulenger, *Epicrates monensis monensis* Zenneck, *Alsophis portoricensis variegatus* Schmidt) or are not known to be subspecifically differentiated from their neighbors (*Mabuya mabouya sloanei* Daudin, *Hemidactylus mabouia* Moreau de Jonnès).

Satellite to Isla Mona is Isla Monito. This islet (Rolle et al., 1964) lies 5 km northwest of Isla Mona, is roughly rectangular (about 500 m × 300 m), and "is covered with a xeric scrub vegetation consisting primarily of cacti, shrubs, and stunted trees growing from cracks in the limestone." As the 30- to 45-m high vertical cliffs have been undercut by wave action, the island is uninhabited and very difficult to land on. Observations on its biota have been few, most being ornithological and made while observers circled the islet by boat. However, Francis J. Rolle, Harold Heatwole, Richard Levins, and Frank Torres were able to ascend the vegetated platform on 31 May 1963 and to briefly study the land biota. They encountered 7 species of birds (all sea birds) and 2 species of lizards (*Anolis monensis*, *Mabuya mabouya*). Such a paucity of amphibians and reptiles is not unexpected when one considers the tiny extent of the islet.

On 20 May 1974, Fred G. Thompson and H. W. Campbell visited Isla Monito. They too encountered *A. monensis* and *M. mabouya* but also collected an adult male *Sphaerodactylus* as well as a fertile gecko egg which hatched on 22 September 1974. When they later collected *S. monensis* on Isla Mona, they recognized that the adult sphaerodactyl from Monito was quite distinctive when compared with the Mona material. I examined both the adult and the hatchling from Isla Monito in 1975 and confirmed that they were quite different—so different in fact, that it is difficult to ally them closely to *S. monensis* or to any other geographically proximate species. In fact, in dorsal pattern the Isla Monito lizards resemble *S. savagei* Shreve from extreme eastern Hispaniola or *S. mariguanae* Cochran from Mayaguana Island in the southeastern Bahama Islands and Grand Turk Island in the Turks Islands. The two specimens do not resemble any of the Puerto Rican species of which *S. macrolepis* Günther is the most widespread, nor are they like *S. difficilis* Barbour, the most widespread Hispaniolan species, or *S. clenchi* Shreve, a second Hispaniolan species limited to the eastern portion of that island. Also, they differ from *S. levinsi* Heatwole from Isla Desecheo, a slightly larger island 19 km off Punta Higuero in northwestern Puerto Rico. Isla Desecheo has a diameter of 1.6 km and a maximum elevation of 230 m; it too is cactus-covered and has xeric woodland (Heatwole, 1968). Four species of reptiles (*Alsophis portoricensis* Reinhardt and Lütken, *Ameiva exsul* Cope, *Anolis* cf. *monensis* or *cristatellus*, and *S. levinsi*) have been recorded.

Since the Isla Monito lizards are so distinctive, I propose to accord them specific rank.

Sphaerodactylus micropithecus, new species

Holotype.—University of Florida/Florida State Museum (UF/FSM) 21570, an adult male, from Isla Monito, taken 20 May 1974 by F. G. Thompson and H. W. Campbell, Original number FGT 1877.

Paratype.—UF/FSM 21571, hatchling from egg taken on Isla Monito on 20 May 1974 and hatched in laboratory 22 September 1974.

Definition.—A species of *Sphaerodactylus* characterized by the combination of moderate size (male to 32 mm snout–vent length, females unknown), 34–36 keeled, acute, imbricate dorsal scales in axilla to groin distance, each scale with 7–9 hair-bearing scale organs around its free edge; middorsal zone of granular scales absent; midbody scales 53–56; 3 supralabial scales to mid-eye; 1 internasal scale; snout scales smooth and flat, not rounded, tuberculate, and keeled; escutcheon short and relatively compact (6 × 14 scales); throat scales keeled, chest and ventral scales cycloid and smooth, 32 between axilla and groin; dorsum (as preserved) pale tan and with irregular randomly placed groups of dark scales, no black or dark scapular patch with included ocelli but with two brown blotches, concolor with

Fig. 1. Dorsal view of male holotype of S. *micropithecus* (UF/FSM 21570).

dark dorsal blotching and each with an included ocellus concolor with dorsal ground color; head vaguely trilineate with brown; and a moderately dark sacral U (Fig. 1).

Description of holotype.—An adult male with a snout–vent length of 32 mm and tail length (distal third broken) 20 mm. Dorsal scales 34 in axilla to groin, ventral scales 32 in same distance; midbody scales 56; supralabial scales to mid-eye 3/3; internasal 1; 9 fourth toe lamellae; escutcheon 6 × 14; gular scales keeled, chest and ventral scales smooth. Dorsum (as preserved) pale tan; a pair of subquadrate to rectangular brown scapular patches, left larger than right, each with a tan ocellus; remainder of dorsum with irregular and randomly placed groups of dark brown scales giving a mottled aspect, this pattern becoming finer and less contrasting laterally; a dark sacral U; upper surfaces of all limbs vaguely mottled with brown on a tan ground; upper surface of head vaguely trilineate with a pair of brown canthal-temporal lines from snout through eyes and ending postoccipitally in a vague U; interocular area pale but with a brown spot behind level of eyes middorsally, this spot obscurely attached to dark canthal-temporal lines and to postoccipital U; vague brown postocular line extending to above forelimb insertion where it merges with dorsal mottled pattern elements; all these head pattern elements on a densely stippled brownish ground not so strongly contrasting as body markings; throat stippled with brown but without definite markings or pattern; venter pale tan.

Paratype.—The single paratype is a hatchling with a snout–vent length of 14 mm. The specimen is desiccated, but the counts are as follows: dorsals axilla to groin 36, ventrals axilla to groin 32, midbody scales 53, supra-

labials to eye-center 3/3, 1 internasal, 10 fourth toe subdigital lamellae. Gular, chest, and ventral scales smooth and dorsal scales keeled. Vaguely marked dorsally with darker brown scales in slight contrast to a dark tan ground color; sacral U prominent and outlined posteriorly with pale tan; a bare indication of scapular brownish blotches but ocelli not now obvious; head pattern obscured due to condition of lizard.

Comparisons.—S. *micropithecus* requires two sets of comparisons: 1) with those species which are adjacent to it geographically (*monensis*, *levinsi*), and 2) with those which it resembles in dorsal pattern (*savagei*, *mariguanae*). I have not examined specimens of S. *levinsi*, but the original description and figure (Heatwole, 1968) are sufficiently clear and detailed to allow for comparisons with the exception of snout–vent length. I have examined 71 S. *monensis*, 260 S. *savagei*, and 116 S. *mariguanae*.

The most pertinent comparisons are with S. *monensis*. Dorsal scale counts are 23–32 in that species, 34–36 in S. *micropithecus*; midbody scales are 42–51 in S. *monensis*, 53–56 in S. *micropithecus*. The maximum size in both sexes of S. *monensis* is 30 mm snout–vent length, whereas the holotypic male S. *micropithecus* has a snout–vent length of 32 mm. The two species are extremely different in pattern. S. *monensis* has a transversely elongate black scapular patch, prominently outlined by pale gray and with an included pair of often transversely elongate ocelli; the head pattern is subdued and consists of a pair of dark brown preocular lines on the snout that join to form a reversed V, and a pair of brown postorbital lines which are lost in vague nuchal blotching. Thomas and Schwartz (1966) have a dorsal view of the pattern of S. *monensis* that shows the vague head pattern and the sharply contrasting black scapular patch and ocelli. Although the head patterns of S. *monensis* and S. *micropithecus* are somewhat similar, the lack of a bold and contrasting black scapular patch in the the latter species easily separates the two. The fact that the hatchling S. *micropithecus* lacks the patch is significant; such dark scapular patches are commonplace in adult females (and often also in males) of many species of *Sphaerodactylus*. Since juvenile *Sphaerodactylus* are almost invariably female-patterned, regardless of sex, the fact that the single hatchling of S. *micropithecus* lacks a scapular patch, in contrast to juvenile S. *monensis*, reinforces this chromatic distinction between the two taxa.

Heatwole (1968) gave detailed pattern and scutellar details on six specimens of S. *levinsi* and a photograph of the dorsal head pattern. The only snout–vent length given is that of the holotype male (28.2 mm); since he made no comments on S. *levinsi* being either larger or smaller than S. *monensis* (which appears to be its closest relative), I suspect that the Desecheo species is about the same size as S. *monensis* and thus smaller than S. *micropithecus*. Dorsal scales in axilla to groin are greater (34–36) in S. *micropithecus* than in S. *levinsi* (27–32), as are also midbody scales (53–56

in S. *micropithecus*, 46–48 in S. *levinsi*). Fourth toe lamellae are 7–8 in S. *levinsi* and 9–10 in S. *micropithecus*. In pattern S. *levinsi* has a dark brown scapular patch and included white ocelli, and the head pattern is much more distinct and complete than in S. *micropithecus*, although the two are somewhat comparable. The presence of a distinct pale longitudinal frontal bar is characteristic of S. *levinsi*; although S. *micropithecus* has a pale frontal area, it is not sharply set off from the remainder of the dorsal cephalic pattern.

Hispaniolan S. *savagei* both resembles and differs from S. *micropithecus*. Males reach a maximum snout–vent length of 33 mm and are thus comparable in size. But dorsal scales are 21–31 in axilla to groin (versus 34–35 in S. *micropithecus*), and midbody scales are 34–50 in S. *savagei* (53–56 in S. *micropithecus*). S. *savagei* always has smooth gular scales, whereas these scales are keeled in S. *micropithecus*. Male S. *savagei* are pale with scattered dark brown to black scales giving a strong salt-and-pepper effect. There is a pair of white to buffy scapular ocelli interconnected by a dark brown bar or dash. Heads in male S. *savagei* are non-lineate yellow (although they are quinquelineate in females), usually overlaid by large irregular dark brown to black spots with cream frosting between them, totally dissimilar to the pattern (and color?) in male S. *micropithecus*.

Compared to S. *mariguanae* which is geographically more distant but somewhat similar in male pattern, S. *micropithecus* is much smaller (male S. *mariguanae* to 41 mm snout–vent length), and has fewer dorsals (34–36 versus 37–47) and ventrals (53–56 versus 57–61) in axilla to groin distance. Although the two species are vaguely similar in dorsal pattern, they differ in many details. The male head pattern (Schwartz, 1968) consists of either a plain or lightly stippled snout, a postocular dark U including within itself a dark short longitudinal dash or line beginning between the eyes and extending posteriorly, an hourglass-shaped occipito-nuchal figure, a black or dark brown scapular spot outlined anteriorly by a straight pale line, and an extremely elongate U from the eyes to behind the scapular spot. The dorsum is irregularly mottled with light and dark. Schwartz (1968:Fig. 3) showed three pattern variants of S. *mariguanae*. Although Fig. 3C in some ways approaches the condition in S. *micropithecus*, the resemblances are at best superficial.

Thomas and Schwartz (1966) commented upon the presence of hair bearing and knoblike scale organs in sphaerodactyls from Greater Puerto Rico. Within the species S. *macrolepis* occur populations which have both knoblike and hair bearing organs, and others with only hair bearing organs. Although those types of scale organs do not appear to be species-constant, they may still yield information on relationships between taxa. In most species herein considered (*micropithecus*, *monensis*, *savagei*, *mariguanae*), only hair bearing organs are present, the number ranging from 4 (*mari-*

guanae) to 12 (*savagei*) organs per scale. Heatwole (1968) noted that S. *levinsi* apparently lacks scale organs entirely; if so, then this species stands alone among all known *Sphaerodactylus* where scale organs of one or both types are of widespread occurrence.

Etymology.—From the Greek prefix *mikros* meaning little and the Greek *pithekos* meaning ape, in reference to Isla Monito (Spanish, "little ape" island).

Remarks.—The striking differences between S. *monensis* and S. *micropithecus* are made even more puzzling by the tiny size of the islet upon which the latter occurs. Isla Mona and Isla Monito are remote remnants of an insular platform, extending from Isla Mona east through the Virgin Islands. Schmidt (1928) first coined the term Greater Puerto Rico for this land mass. Separation of portions of Greater Puerto Rico apparently was due in part to faulting and in part to recession of the ocean. Khudoley and Meyerhoff (1971) suggested that the Mona Passage faulting occurred in the middle to late Eocene, and that both Mona and Puerto Rico have been volcanically inactive since the middle Eocene. Their map (Fig. 26) showed a continuous volcanic facies from throughout the Virgin Islands in the east, across Puerto Rico, Hispaniola, and Jamaica in the west during late Cretaceous through middle Eocene times. These data all suggest that Isla Mona (and Isla Monito) have been only relatively recently separated from Puerto Rico (and Hispaniola). Consequently, the Mona-Monito faunule would seem to be a remnant or relict one, determined by what species (from both Puerto Rico and Hispaniola) occuiped the Mona-Monito area of this continuous land mass at the time of its Eocene separation. Doubtless, Mona and Monito were at one time larger masses which, through the passage of time, have become smaller, primarily through erosive action of the ocean. It would seem also likely that with decreasing area, there would be a concomitantly smaller faunule; those species which still remain on these two islands are thus only a remnant of those which occurred there at one (pre-Eocene?) time.

Heatwole (1968), commenting upon the proposed schema of evolution and relationships of the Puerto Rico *Sphaerodactylus* by Thomas and Schwartz (1966), suggested that S. *monensis* and S. *levinsi* arose from the proto-*macrolepis* stock; the physical configuration of Puerto Rico during the Pleistocene would faciliate flotsam transport to Mona directly, and later, with changing coastline and currents in southwestern Puerto Rico, transport to Isla Desecheo. He thus suggested that these two isolates of early S. *macrolepis* were of Pleistocene origin, and that S. *monensis* was the earlier of the two populations to become established.

Although quite unlike S. *monensis*, S. *micropithecus* seems most closely allied to the *macrolepis* complex on Puerto Rico (in contrast to the *difficilis* complex on Hispaniola). Combining the information from Heatwole,

and Khudoley and Meyerhoff, offers a possible explanation for the dissimilarities between S. *monensis* and S. *micropithecus*. Perhaps S. *micropithecus* is a relict of the ancient (pre-Eocene) fauna of this part of Greater Puerto Rico; it or a near relative may also have persisted temporarily on Isla Mona. Thus, S. *micropithecus* perhaps is closer to a proto-*macrolepis* stock than any other species; the absence of a distinctively colored scapular patch (black, dark brown) with included ocelli in S. *micropithecus* can be interpreted as the result of very long standing isolation; Thomas and Schwartz (1966) considered the presence of this patch as primitive in this complex of Puerto Rican geckoes. With subsequent colonization of Isla Mona (but not Isla Monito) from the Puerto Rican mainland during the Pleistocene by a proto-*macrolepis* with a prominent scapular patch and ocelli, S. *micropithecus* remained alone on Isla Monito and suffered no competition with newly invasive proto-*macrolepis* which gave rise to S. *monensis*. Such a history seems at least plausible and accounts for the striking differences in many features between S. *monensis* and S. *micropithecus* and suggests a scenario to account for not only these differences but also for the persistence of a very different species on a tiny islet in the Mona Passage.

The fauna of Isla Mona is slightly richer in species-number than is that of the much smaller (4 km^2) Navassa Island between the western end of Hispaniola and Jamaica; Navassa has (or had) 8 species, consisting of 6 species of lizards (3 endemic species, 3 endemic subspecies) and 2 snakes (1 endemic subspecies, 1 species so poorly known that whether it is subspecifically different from its Hispaniolan relative is uncertain). Thomas (1966) gave details and comparisons of the Navassan herpetofauna.

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